CLAIMS

1. A digital integrated circuit temperature sensor comprising:

an analog-to-digital converter (3) providing a binary word (DT) representative of a temperature internal to the integrated circuit;

a generating circuit (2) for providing an analog voltage (V_{TH}) representative of the circuit temperature and for generating a reference voltage (V_{BG}) for the analog-to-digital converter; and

a calibration circuit (4) providing respective high (V_{RHF}) and low (V_{RLF}) conversion thresholds to the converter, the low voltage corresponding to said reference voltage (V_{BG}), said calibration circuit comprising:

a first operational amplifier (32) having a non-inverting input receiving said reference voltage (V_{BG}) and having its output providing said high conversion threshold (V_{RHF}), the non-inverting input of the first amplifier being connected to the junction point (33) of two variable resistive elements (R32IN, R32OUT) series-connected between the output terminal (34) of the first amplifier and a supply reference potential (V_{SS}); and

a second operational amplifier (36) having an inverting input terminal receiving the analog voltage (V_{TH}) depending on temperature and having a non-inverting input connected to the midpoint (37) of two resistive elements (R36IN, R36OUT) series-connected between the output terminal of said second operational amplifier and said supply reference potential (V_{SS}), the second operational amplifier providing an amplified voltage to be converted by said analog-to-digital converter (3).

2. The sensor of claim 1, wherein said generating circuit (2) comprises, in parallel between first, second, third, and fourth terminals (11, 15, 19, 21) of a current mirror (30) all providing an identical current (I) from a high supply rail (V_{DD}) and copying the voltage of the first terminal on the second one, to a low supply rail (V_{SS}), respectively:

a first diode-connected PNP-type bipolar transistor (10);

a first resistive element (13) in series with a second diode-connected PNP-type

bipolar transistor (14), the second bipolar transistor being of greater size than the first one;

a second resistive element (18) in series with a third diode-connected PNP-type bipolar transistor (17), the third bipolar transistor being of a size identical to the first one and said third terminal (19) providing the reference voltage (V_{BG}); and

a current-to-voltage conversion element (20), said fourth terminal (21) providing the analog voltage (V_{TH}) representative of the temperature.

3. The sensor of claim 2, comprising a voltage mirror formed of two N-channel MOS transistors (N1, N2), copying the voltage between said first and second terminals.

4. The sensor of claim 2, wherein said conversion element is a resistor (20).

5. The sensor of claim 1, wherein said variable resistive elements (R32IN, R32OUT, R36IN, R36OUT) are formed of networks of switchable resistors.

6. An integrated circuit comprising:

a digital temperature sensor comprising an analog-to-digital converter (3) providing a binary word (DT) representative of a temperature internal to the integrated circuit, and a generating circuit (2) for providing an analog voltage (V_{TH}) representative of the circuit temperature and for generating a reference voltage (V_{BG}) for the analog-to-digital converter; and

a JTAG port of communication with the outside of the circuit, an input/output register (62) of the integrated circuit being connected to a register (5) for memorizing the result provided by the analog-to-digital converter (3).

7. The circuit of claim 6, wherein said digital temperature sensor is the sensor of claim 1.

8. An integrated circuit comprising:

a digital temperature sensor comprising an analog-to-digital converter (3) providing a binary word (DT) representative of a temperature internal to the integrated circuit, and a generating circuit (2) for providing an analog voltage (V_{TH}) representative of the circuit temperature and for generating a reference voltage (V_{BG}) for the analog-to-digital converter; and

a logic block (71) of interpretation of the current temperature measured by the sensor to control the frequency (f) and/or the supply voltage (V_{DD}) of the integrated circuit.

9. The circuit of claim 8, wherein digital temperature sensor is the sensor of claim 1.

10. A method for controlling the clock frequency (f) of a digital integrated circuit, consisting of varying the clock frequency in a way inversely proportional to the internal temperature of the circuit.

11. The method of claim 10, wherein the temperature is measured by means of a sensor comprising:

an analog-to-digital converter (3) providing a binary word (DT) representative of a temperature internal to the integrated circuit; and

a generating circuit (2) for providing an analog voltage (V_{TH}) representative of the circuit temperature and for generating a reference voltage (V_{BG}) for the analog-to-digital converter.

12. The method of claim 10, wherein the temperature is measured by means of the sensor of claim 1.

13. A method for controlling the supply voltage (V_{DD}) of a digital integrated circuit, consisting of varying the supply voltage in a way inversely proportional to the internal circuit temperature.

14. The method of claim 13, wherein the temperature is measured by means of a sensor comprising:

an analog-to-digital converter (3) providing a binary word (DT) representative of a temperature internal to the integrated circuit; and

a generating circuit (2) for providing an analog voltage (V_{TH}) representative of the circuit temperature and for generating a reference voltage (V_{BG}) for the analog-to-digital converter.

15. The method of claim 13, wherein the temperature is measured by means of the sensor of claim 1.